

Amendments to the Claims

This listing of claims will replace all prior versions, or listings, or claims in the application.

Listing of Claims:

1. (currently amended) A latching hinge method of making an electronically controlled MEMS device comprising the steps of:

fabricating electronic control circuit module and MEMS active element module portions of said MEMS device on first permanent and second sacrificial substrate members respectively;

said second sacrificial substrate MEMS active element module fabrication including also multiple substrate layers-resident sacrificial supplementary components comprised of a substrate hinge mounted etch plate, etch plate to MEMS active element module connection tethers, a substrate coupled etch plate latch assembly and an etch plate to sacrificial substrate anchor assembly;

releasing said MEMS active element module and selected of said sacrificial supplementary components from fabrication-related confinement in said substrate multiple layers into movable, partially attached to one of said sacrificial substrate and to other of said supplementary components, states;

release of said substrate hinge mounted etch plate and tether coupled MEMS active element module combination from a temporary confinement by said anchor assembly into a substrate hinge-enabled pivotal condition being a final of said releasing events;

rotating said released hinge mounted etch plate and tether coupled MEMS active element module combination at said hinge into a selected off of sacrificial substrate position by applying external forces to said etch plate and tethered MEMS active element module combination;

latching said etch plate and tethered MEMS active element module combination into said selected off MEMS substrate rotated position by coupling extendable portions of said etch plate latch assembly with said etch plate using external latch assembly-received forces;

moving said MEMS active element module, said tether-attached etch plate, and said hinge attached MEMS active element sacrificial substrate combination into a position of selectably aligned MEMS active element module engagement with said electronic control circuit module; ~~and~~

engaging said MEMS active element module and said electronic control circuit module into an aligned, device housing-surrounded electronically controlled MEMS device; and

discarding said tethers, said etch plate, said etch plate latch assembly, said etch plate to substrate anchor assembly and said sacrificial second substrate.

2. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said MEMS device includes a micromirror active element.

3. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said electronic control circuit module includes CMOS electronic circuits.

4. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said electronic control circuit module and said first permanent substrate member are comprised of different semiconductor materials with respect to said MEMS active element module and said second sacrificial substrate member.

5. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said step of releasing said MEMS active element module and selected of said sacrificial supplementary components from fabrication confinement in said multiple layers includes etching away a reagent-responsive layer of substrate coating material.

6. (original) The latching hinge method of making an electronically controlled MEMS device of claim 5 wherein said reagent-responsive layer of substrate coating material is an oxide layer.

7. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein:

said release of said etch plate from temporary confinement by said anchor assembly includes a chemical reactant free physical change in said anchor assembly.

8. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said step of engaging said MEMS active element module and said electronic control circuit module into an aligned, device housing-surrounded electronically controlled MEMS device includes a MEMS device package sealing event.

9. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said rotating step selected off of sacrificial substrate position is a position of one hundred eighty degrees rotation with respect to an upper surface of said sacrificial substrate.

10. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said step of latching said etch plate and tethered MEMS active element module combination into said selected off MEMS substrate rotated position includes moving portions of said substrate coupled etch plate latch assembly with a tip portion of a portable wafer probe element.

11. (original) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein said multiple layers resident sacrificial supplementary components further include a plurality of physically stressed lifting beams engaging with said substrate hinge-mounted etch plate and performing an initial separation of said etch plate from said sacrificial substrate.

12.-36. (canceled)

37. (new) The latching hinge method of making an electronically controlled MEMS device of claim 1 wherein one of said steps of releasing and rotating includes

a heating severing of connection tethers connected with one of said etch plate and said active element module.

38. (new) The latching hinge method of making an electronically controlled MEMS device of claim 37 wherein said heating severing of connection tethers includes one of an electrical current flow burning through step and a laser energy heating step.

39. (new) A hinge and latch method of fabricating an electronically controlled MEMS device comprising the steps of:

forming electronic control circuit module and MEMS active element module portions of said MEMS device on first permanent and second sacrificial substrate members respectively;

said second sacrificial substrate MEMS active element module forming step including providing multiple substrate layers-resident sacrificial supplementary components comprised of a substrate hinge mounted etch plate, etch plate to MEMS active element module connection tethers, a substrate coupled etch plate latch assembly and an etch plate to sacrificial substrate anchor assembly;

releasing said MEMS active element module and selected of said sacrificial supplementary components from forming-related confinement in said substrate multiple layers into movable, hinge mounted to one of said sacrificial substrate and to other of said supplementary components, states;

rotating said released hinge mounted etch plate and tether coupled MEMS active element module combination at said hinge into a selected off of sacrificial substrate position by applying external forces to said etch plate and tethered MEMS active element module combination;

latching said etch plate and tethered MEMS active element module combination into said selected off MEMS substrate rotated position by coupling slidably movable portions of said etch plate latch assembly with said etch plate using external, latch assembly-received, forces;

disposing said MEMS active element module, said tether-attached etch plate, and said hinge mounted MEMS active element sacrificial substrate

combination into a position of registered MEMS active element module engagement with said electronic control circuit module; and

engaging said MEMS active element module and said electronic control circuit module into a registered, fixed, device housing-surrounded, electronically controlled MEMS device.

40. (new) The latching hinge method of making an electronically controlled MEMS device of claim 39 wherein said step of forming electronic control circuit module and MEMS active element module portions of said MEMS device on first permanent and second sacrificial substrate members respectively further includes providing on said first permanent substrate member a plurality of sliding engagement guide rail members and a release plate member latching assembly captured therein.

41. (new) The latching hinge method of making an electronically controlled MEMS device of claim 39 wherein said step of providing multiple substrate layers-resident sacrificial supplementary components comprised of a substrate hinge includes forming a hinge structure having a hinge pin element that is surrounded by a movable hinge staple portion.